PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H04M 3/56 — A2

(11) International Publication Number: WO 00/33550

(43) International Publication Date: 8 June 2000 (08.06.00)

(21) International Application Number: PCT/NO99/00353

(22) International Filing Date: 23 November 1999 (23.11.99)

(30) Priority Data:
19985567 27 November 1998 (27.11.98) NO

(71) Applicant *(for all designated States except US)*: TELEFONAKTIEBOLAGET LM ERICSSON [SE/SE]; S–126 25 Stockholm (SE).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: CORNELIUSSEN, Knut, Snorre, Bach [NO/NO]; Bygdøy allé 117A, N–0273 Oslo (NO).

(74) Agent: OSLO PATENTKONTOR AS; Postboks 7007 M, N–0306 Oslo (NO).

(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), DM, EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

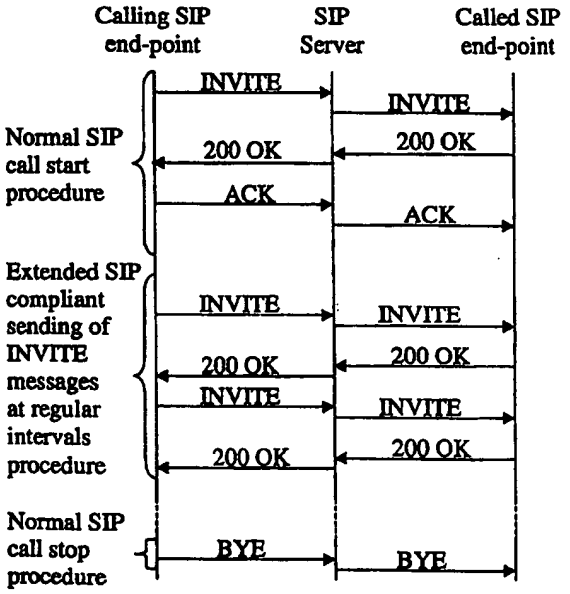
Published

Without international search report and to be republished upon receipt of that report.

(54) Title: METHOD FOR EXTENDING THE USE OF SIP (SESSION INITIATION PROTOCOL)

(57) Abstract

The present invention relates to a method for extending the use of SIP (Session Initiation Protocol), especially in a communication system wherein H.323 or SIP compliant end–points communicate with the media traffic directly between other H.323 or SIP compliant end–points, and wherein the signalling is sent to either a gatekeeper or an SIP server, and in which system the start of a conversation message in the associated SIP protocol is here called INVITE, and for the purpose of support an extension of the SIP protocol to provide better support for charging for thereby more easily to detect when a conversation is closed, it is according to the present invention suggested that extra INVITE messages are sent to said SIP server.



This figure shows how the SIP protocol can be extended to support a "continue call" function. Note that for simplicity only the INVITE messages from the calling end-point is shown.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

METHOD FOR EXTENDING THE USE OF SIP (SESSION INITIATION PROTOCOL)

Field of the invention

The present invention relates to a method for extending the use of SIP (Session Initiation Protocol), of the type as stated in the preamble of the enclosed patent claim 1.

More specifically the present invention relates to such a method for facilitating the charging of such SIP connections.

Technical Background

THE PROBLEM

SIP [1] is a competitive protocol to H.323 [2] to provide Multimedia applications to operate over the IP protocol. The Internet Engineering Task Force (IETF) has standardized SIP. The latest version of SIP is currently only a draft, provided by the MMUSIC WG in IETF.

The SIP protocol supports most of the features from the H.323 protocol, but it is simpler in respect to number of different messages. The fact that the SIP is simpler then H.323 (at the current version an SIP only supports six different messages) makes it easier to make a SIP compliant end-point than an H.323 compliant end-point. New development tools and programming languages also makes it easier to control media-interfaces. This makes it also an easier task to make a multi-media end-point. When making an end-point it is also easy to add more logic and functionality than stated in the standard.

One of the methods for performing charging for SIP or H.323 conversations is to place the charging logic inside an SIP server or gatekeeper (H.323) see Figure 1.

One of the problems with SIP is that it doesn't have support for a typical "continue call" message. Another problem is that SIP compliants could send the close message directly to each other instead of via an SIP server. This makes it difficult to support charging for SIP conversations. The reason for this is that because the media traffic is not sent via the gatekeeper or the SIP server, it is difficult to know when the conversation is closed.

Known solutions

In the H.323 standard there is support for a "continue call" message. In the Q.931 [3] part of H.323 the message is called status inquiry. In the RAS part of H.323 the IRR message can be used for the same purpose. In H.323 it is also required that the end-points send the "close conversation" message via the gatekeeper (if a gatekeeper routed call model is used).

Objects of the invention

An object of the present invention is to provide a method by which the use of SIP (Session Initiation Protocol) is extended in a rational and expedient manner.

A further object of the present invention is to provide a method by which it is radially observed when a conversation between two end-points are terminated.

A still further object of the present invention is to provide a method by which charging for SIP conversations can be stipulated in a very accurate and expedient manner.

A still further object of the present invention is to provide a method by which the message "continue call" is favourably supported by a corresponding SIP server.

Brief disclosure of the invention

These objects are achieved in a method as stated in the preamble, which is characterised by the features as stated in the characterising clause of the enclosed patent claim 1.

In other words, the present invention can be defined as an extension of the SIP protocol, the main idea of the present invention being that the missing "continue call" message is solved by sending extra INVITE messages to the SIP server.

Further features and advantages of the present invention will appear from the following description taken in conjunction with the enclosed drawings, as well as from the further attached patent claims.

Brief disclosure of the drawings

Fig. 1 is a block diagram illustrating how the signalling is sent to either a gatekeeper or an SIP server, the media traffic being sent directly between the H.323 or SIP compliant end-points.

Fig. 2 is a schematical diagram illustrating how the SIP protocol can be extended to support a "continue call" function, it being noted that for simplicity only the INVITE messages from the calling end-point being shown.

Detailed description of embodiments

As previously explained, Fig. 1 illustrates one of the methods for performing charging for SIP or H.323 conversations by placing the charging logic inside an SIP server or gatekeeper (H.323). This Figure shows how the signalling is sent either to a gatekeeper or a SIP server. The media traffic is sent directly between the H.323 or SIP compliant end-points.

In the SIP protocol the start of conversation message is called INVITE. This message is sent to the SIP server when a SIP compliant end-point wants to initiate a conversation with another end-point, or start a conference with several end-points. The INVITE message contains information about what type of media it supports, and together with the ACK message this information is used as the method for negotiation of media streams. When an end-point wants to add or remove media streams the INVITE message is also used. When the INVITE message is used to define the set of current media streams, the CALL-ID in the INVITE message must be the same as the first INVITE message.

The present invention is to be regarded as an extension of the SIP protocol. The main idea behind the present invention is that the missing "continue call" message is solved by sending extra INVITE messages to the SIP server.

In Fig. 2 it is illustrated how the SIP protocol can be extended to support a "continue call" function. It should be noted that for the sake of simplicity only the INVITE messages from the calling end-point are shown.

Most appropriately the present invention may be realised in that the extra INVITE messages are sent at regular intervals. These INVITE messages should be equal to the last INVOKE message that was sent according to the SIP protocol. This means that the CALL-ID and the media channel described in the INVITE message must be the same. The CSeq (command sequence) field should also be the same in the extra INVITE messages as in the original INVITE message.

If the SIP server doesn't receive an INVITE message during the predefined interval, it considers the SIP conversation between the end-points as closed. To inform the other end-point(s), the SIP server should send a BYE message to it. To increase robustness the SIP server should also send the

BYE message to the end-point that has stopped sending INVITE messages.

The reason for a stop in the sending of the INVITE message could be that the end-point has sent a BYE message directly to the other end-point, or it could be that the end-point has crashed, the physical link is broken, etc.

This solution requires some extension to the original SIP protocol. This should not be a problem because it is quite easy to make SIP end-points. If, however, normal SIP end-points must be used, the solution is to add a special SIP proxy. The requirement for this proxy is that it has some knowledge about the physical layer of the normal SIP end-point. This special SIP proxy will act as a normal SIP proxy as described in the SIP standard, but it will send new INVITE messages at regular intervals to the SIP Server during the conversation. Because this SIP proxy has some knowledge about the physical layer of the normal end-point, it should stop sending new INVITE messages when it discovers that the end-point stops sending media streams.

Advantages

By using the idea described in the section above a robust charging mechanism can be implemented for SIP. This charging mechanism can base its charge not only on a fixed price per conversation, but also on a time component since it knows the duration of the conversation. This charging mechanism can also base it charge on a volume component since the type of media used is described in the INVITE message. Charging for volume can also be done in a normal SIP implementation.

Another advantage of the idea with extra INVITE messages is that an end-point that uses this method is still totally compliant to normal SIP end-points. The normal SIP end-

point will only consider the extra INVITE message as a retransmission of an old one. This is because it has the same CALL-ID, CSeq and media description. It is also said in the standard that the end-points should consider INVITE message with the same CSeq as retransmission, and it should be dropped.

Broadending

Another message than INVITE could be used for implementing the "continue call" function in SIP, i.e. a new message type could be used. If a new signal is used, it should operate in the same way as the extra INVITE described in the sections above. If a new message type is used it is not guarantied that it will inter operate with normal SIP end-points.

References

[1] Handley/Schulzrinne/Schooler/Rosenberg "SIP: Session Initiation Protocol" Internet Draft, Internet Engineering Task Force, ietf-mmusic-sip-09.txt, September 18, 1998

[2] ITU-T Recommendation H.323 (1998), "Packet-based multimedia communication systems".

[3] ITU-T Recommendation Q.931 (1993), "ISDN user-network interface layer 3 specification for basic call control"

Patent claims

1. Method for extending the use of SIP (Session Initiation Protocol), especially in a communication system wherein H.323 or SIP compliant end-points communicate with the media traffic directly between other H.323 or SIP compliant end-points, and wherein the signalling is sent to either a gatekeeper or an SIP server, and in which system the start of a conversation message in the associated SIP protocol is here called INVITE,
characterised in that extra INVITE messages are sent to said SIP server.

2. Method as claimed in claim 1,
characterised in that the extra INVITE messages are sent at preferably regular time intervals.

3. Method as claimed in claim 1 or 2,
characterised in that the extra INVITE messages are equal to the last INVITE message that was sent according to the SIP protocol, meaning that the CALL-ID and the media channel described in the INVITE message is the same.

4. Method as claimed in any of the claims 1-3,
characterised in that the CSeq (Command Sequence) will be the same in the extra INVITE messages as in the original INVITE message.

5. Method as claimed in any of the preceding claims,
characterised in that upon receipt of no INVITE message after a predetermined time interval, the system will consider the SIP conversation between the associated end-points as closed.

6. Method as claimed in claim 5,
characterised in that after the receipt of no INVITE message after a predetermined time interval, said

server will send a BYE message to the end-point that stopped sending extra INVITE messages.

7. Method as claimed in any of the preceding claims, characterised in that the method allows communication with means which can detect the reason for stopping the sending of INVITE messages.

8. Method as claimed in claim 7, characterised in that the method communicates with means for detecting whether an end-point has sent a BYE message directly to the other end-point, or for detecting that the end-point has crashed, the physical link has broken down, etc.

9. Method as claimed in claim 7 or 8, characterised in that the method is adapted to correspond with a special SIP proxy, said special SIP proxy acting as a normal SIP proxy but sending new INVITE messages at regular intervals to the SIP server during the conversation.

10. Method as claimed in any of the claims 7-9, characterised in that said SIP proxy is adapted to have some knowledge about the physical layer of the normal end-point, and is adapted to stop sending new INVITE messages when it is discovered that the end-point involved stops sending media streams.

11. Method as claimed in any of the preceding claims, characterised in that the method allows for a charging mechanism based not only on a fixed price per conversation, but also on a time component since it knows the duration on the conversation, the charging mechanism possibly being based on a volume component since the type of media used is described in the INVITE message.

12. Method as claimed in any of the preceding claims, characterised in that the another message than INVITE is used for implementing the "continue call" function in said SIP, said new INVITE messages being adapted to inter operate with normal SIP end-points as well as possibly adapted SIP end-points.

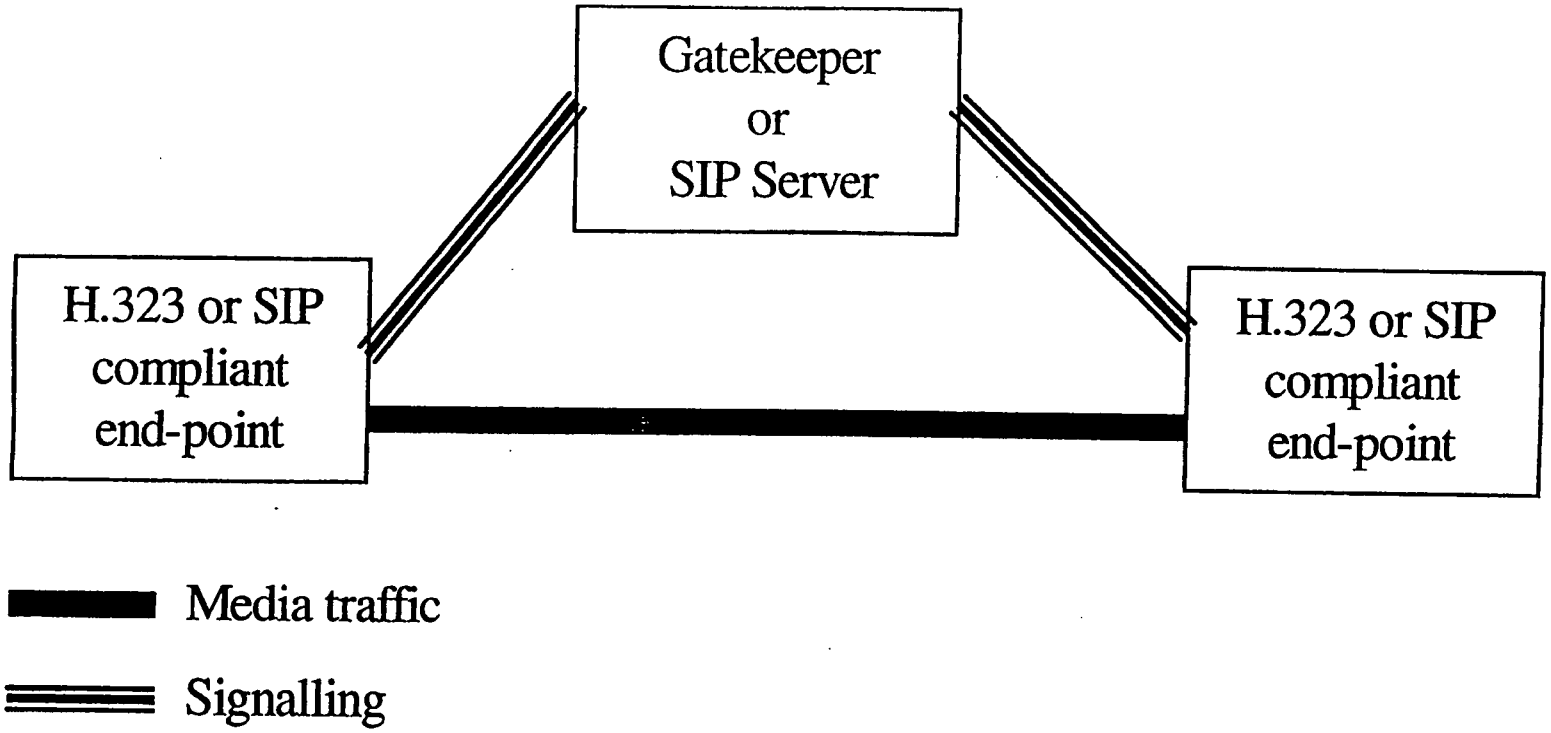


Figure 1 This figure shows how the signalling is sent to either a gatekeeper or a SIP server. The media traffic is sent direclty between the H.323 or SIP compliant end-points.

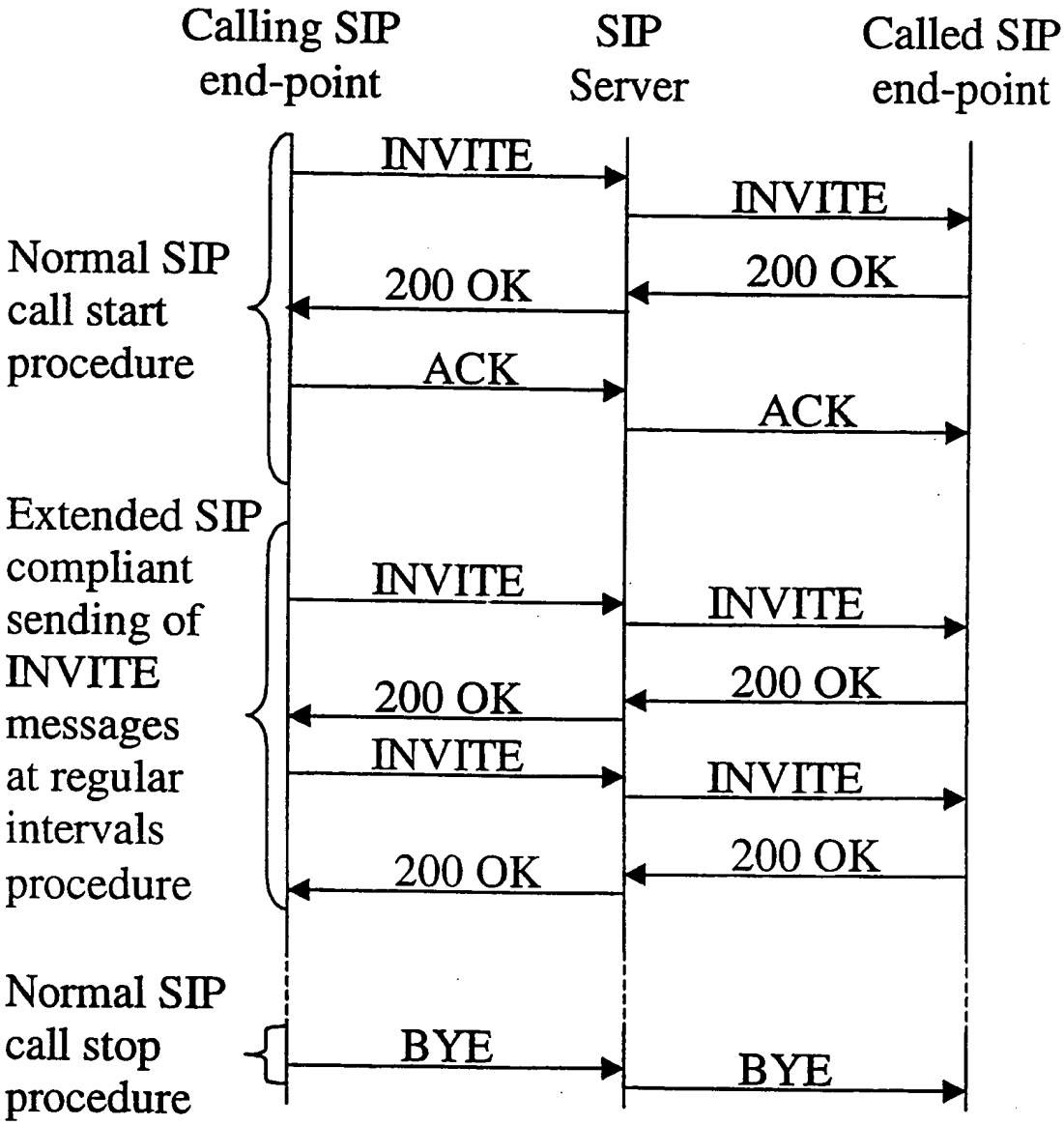


Figure 2 This figure shows how the SIP protocol can be extended to support a "continue call" function. Note that for simplicity only the INVITE messages from the calling end-point is shown.

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H04M 3/56 | A3

(11) International Publication Number: WO 00/33550

(43) International Publication Date: 8 June 2000 (08.06.00)

(21) International Application Number: PCT/NO99/00353

(22) International Filing Date: 23 November 1999 (23.11.99)

(30) Priority Data:
19985567 27 November 1998 (27.11.98) NO

(71) Applicant *(for all designated States except US)*: TELEFONAKTIEBOLAGET LM ERICSSON [SE/SE]; S–126 25 Stockholm (SE).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: CORNELIUSSEN, Knut, Snorre, Bach [NO/NO]; Bygdøy allé 117A, N–0273 Oslo (NO).

(74) Agent: OSLO PATENTKONTOR AS; Postboks 7007 M, N–0306 Oslo (NO).

(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), DM, EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

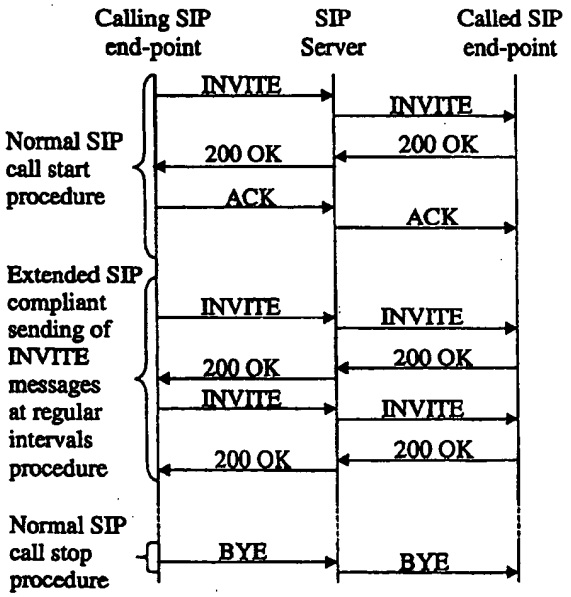
Published
With international search report.

(88) Date of publication of the international search report:
23 November 2000 (23.11.00)

(54) Title: METHOD FOR EXTENDING THE USE OF SIP (SESSION INITIATION PROTOCOL)

(57) Abstract

The present invention relates to a method for extending the use of SIP (Session Initiation Protocol), especially in a communication system wherein H.323 or SIP compliant end–points communicate with the media traffic directly between other H.323 or SIP compliant end–points, and wherein the signalling is sent to either a gatekeeper or an SIP server, and in which system the start of a conversation message in the associated SIP protocol is here called INVITE, and for the purpose of support an extension of the SIP protocol to provide better support for charging for thereby more easily to detect when a conversation is closed, it is according to the present invention suggested that extra INVITE messages are sent to said SIP server.



This figure shows how the SIP protocol can be extended to support a "continue call" function. Note that for simplicity only the INVITE messages from the calling end-point is shown.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 99/00353

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04M 3/56
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0691780 A2 (AT&T CORP.), 10 January 1996 (10.01.96), abstract ---	1-12
A	US 5408526 A (JAMES R. MCFARLAND ET AL), 18 April 1995 (18.04.95), column 1, line 60 - column 2, line 21 ---	1-12
P,A	EP 0954155 A2 (SIEMENS INFORMATION AND COMMUNICATION NETWORKS INC.), 3 November 1999 (03.11.99), abstract ---	1-12

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 April 2000	07 06 2000
Name and mailing address of the International Searching Authority European Patent Office P B 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel(+31-70)340-2040, Tx 31 651 epo nl, Fax(+31-70)340-3018	Authorized officer Stefan Hansson/cs Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 99/00353

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	US 6006253 A (VINEET KUMAR ET AL), 21 December 1999 (21.12.99), column 1, line 64 - column 2, line 11	1-12

--

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/NO 99/00353

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0691780 A2	10/01/96	AU 2481295 A	18/01/96
		CA 2150060 A	09/01/96
		JP 8079308 A	22/03/96
		NO 952702 A	09/01/96
		US 5673080 A	30/09/97
US 5408526 A	18/04/95	NONE	
EP 0954155 A2	03/11/99	NONE	
US 6006253 A	21/12/99	NONE	